Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces

February 2002

Scope Note

Congress has directed the Director of Central Intelligence (DCI) to submit to the Congressional leadership and intelligence committees an annual, unclassified report assessing the safety and security of the nuclear facilities and military forces in Russia. Congress further asked that each report include a discussion of the following:

- The ability of the Russian Government to maintain its nuclear military forces.
- The security arrangements at Russia's civilian and military nuclear facilities.
- The reliability of controls and safety systems at Russia's civilian nuclear facilities.
- The reliability of command and control systems and procedures of the nuclear military forces in Russia.

This annual report is the third responding to this Congressional request. The report addresses facilities and forces of the Russian Ministry of Defense, the Ministry of Atomic Energy, and other Russian institutes. It updates the September 2000 report to Congress.

This paper has been prepared under the auspices of the National Intelligence Officer for Strategic and Nuclear Programs.

Key Points

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Moscow will continue to devote scarce resources to maintaining its nuclear forces. Nevertheless, the aging of Russia's strategic systems and Putin's military reform plan to shift resources to the general purpose forces probably will result in Russia having fewer than 2,000 strategic warheads by 2015. Even with ongoing reductions, Moscow probably will retain several thousand nonstrategic nuclear warheads in its inventory because of concerns over its deteriorating conventional capabilities.

Russia employs physical, procedural, and technical measures to secure its weapons against an external threat, but many of these measures date from the Soviet era and are not designed to counter the pre-eminent threat faced today—an insider who attempts unauthorized actions.

- Moscow has maintained adequate security and control of its ***nuclear weapons***, but a decline in military funding has stressed the nuclear security system. An unauthorized launch or accidental use of a Russian nuclear weapon is highly unlikely as long as current technical and procedural safeguards built into the command and control system remain in place and are effectively enforced. Our concerns about possible circumvention of the system would rise if central political authority broke down.

Security varies widely among the different types of Ministry of Atomic Energy (Minatom) facilities and other Russian institutes.

- Russian facilities housing ***weapons-usable nuclear material***—uranium enriched to 20 percent or greater in uranium-235 or uranium-233 isotopes and any plutonium containing less than 80 percent of the isotope plutonium-238—typically receive low funding, lack trained security personnel, and do not have sufficient equipment for securely storing such material.

Weapons-grade and weapons-usable nuclear materials have been stolen from some Russian institutes. We assess that undetected smuggling has occurred, although we do not know the extent or magnitude of such thefts. Nevertheless, we are concerned about the total amount of material that could have been diverted over the last 10 years.

- In 1992, 1.5 kilograms of 90-percent-enriched weapons-grade uranium were stolen from the Luch Production Association.

- In 1994, 3.0 kilograms of 90-percent-enriched weapons-grade uranium were stolen in Moscow.

- In 1999, we confirmed that nuclear material seized in Bulgaria was weapons-usable. The material—four grams of highly enriched uranium—likely originated in Russia.

- Although not independently confirmed, reports of a theft in 1998 from an unnamed enterprise in Chelyabinsk Oblast are of concern. According to Viktor Yerastov, chief of Minatom's Nuclear Materials Accounting and Control Department, the amount stolen was "quite sufficient material to produce an atomic bomb"—the only nuclear theft that has been so described.

Over the last six years, Moscow has recognized the need for security improvements and, with assistance from the United States and other countries, has taken steps to reduce the risk of theft.

- On their own initiative in 1999, 2000, and in mid-summer 2001, Russian authorities ordered increased security at nuclear facilities due to concerns about a reported increased terrorist threat as a result of Moscow's campaign in Chechnya, according to official statements and media reporting.

- Since the September 2001 terrorist attacks in the United States, Russian officials, including President Putin, have conducted a public campaign to provide assurances that terrorists have not acquired Russian nuclear weapons.

Through the Cooperative Threat Reduction Program and the US Department of Energy's Material Protection, Control, and Accounting Program, the United States continues to assist Russia in improving security at nuclear facilities. **Russia's nuclear security has been slowly improving over the last several years, but risks remain.**

Russia has announced plans to more than double its capacity to generate nuclear power over the next 20 years and to begin construction of reactors with enhanced safety features. Since July 2001, Russian media have reported increased security measures at a number of nuclear power plants. Even with increased security measures, however, such plants almost certainly will remain vulnerable to a well-planned and executed terrorist attack.

- After the September terrorist attacks in the United States, Minister of Atomic Energy Rumyantsev reported that Russian nuclear power facilities are protected by special guards patrolling around the clock in addition to national defense forces. An official of Rosenergoatom reported on 12 September 2001 that security services at the nuclear power plants already were working a "harsh regime" because of the continuing military actions in Chechnya and that additional security measures were not necessary.

Discussion

Since the breakup of the Soviet Union, the security environment surrounding nuclear weapons and materials in Russia has changed radically. Security measures in both the Ministries of Defense (MOD) and Atomic Energy (Minatom) during the Soviet era were aimed at preventing the external or outsider threat; it was virtually unthinkable that an insider would attempt to steal a nuclear weapon or nuclear material. In contrast, the deterioration of the Russian economy, state security apparatus, and military has resulted in an entirely new security environment—one in which concern about an insider threat predominates. The Russians have reacted to this new threat by instituting some new security procedures at their nuclear facilities, including instituting polygraph examinations.

Over the last three years, we have seen Moscow elevate its concern about the security of its nuclear weapons and materials. Russian authorities ordered increased security due to concerns over a growing terrorist threat resulting from Moscow's campaign in Chechnya, according to official statements and media reporting.

- In November 2000, the Russian Government instructed Minatom and other federal executive agencies to implement additional measures to step up the physical security of nuclear installations, including modernizing security systems. Minatom—along with the MOD, the Federal Security Service, and the Ministry of Internal Affairs—was to evaluate external and internal threats to nuclear installations and develop physical security enhancements.

- In addition, immediately following the September terrorist attacks in the United States, Russian President Putin called for the Russian military and security services to heighten security, according to Russian media.

The United States is working cooperatively with Moscow to increase the safety and security of nuclear-related facilities, infrastructure, and personnel. The Russian MOD is responsible for the nuclear military forces and its nuclear weapons storage system. Minatom operates the national nuclear weapons complex, conducts weapons-related tests at the MOD's nuclear test site, and controls most nuclear-related institutes and industrial facilities. Minatom and Rosenergoatom operate Russia's nuclear power reactors.

- The US Department of Defense, through the Cooperative Threat Reduction (CTR) Program, is assisting MOD and Minatom.

- The US Department of Energy, through the Material Protection, Control, and Accounting (MPC&A) Program, exchanges between the US national laboratories and Russian components, and the Nuclear Cities Initiative, is providing security assistance to Minatom; Rosenergoatom; the Russian Navy; Gosatomnadzor (GAN); and the Ministries of Interior, Education, and Economy.

Ministry of Defense

Nuclear Weapons Inventory

Moscow currently maintains fewer than 5,000 operational strategic nuclear warheads in its

strategic nuclear triad, which is composed of ICBMs, submarine-launched ballistic missiles, and heavy bombers carrying nuclear-tipped air-launched cruise missiles. Despite the emphasis on nuclear weapons as Russia's primary means of deterrence, Russian strategic nuclear forces are subject to the same significant budget constraints affecting other portions of the government. The strategic forces will face additional budget cuts, resulting in lower strategic warhead levels, because Putin's military reform plan will shift resources to the general purpose forces. Nevertheless, Moscow continues to devote scarce resources to maintaining and modernizing its forces.

- Russian officials have claimed publicly that the harsh economic realities and aging of strategic systems will drive their strategic forces down to fewer than 2,000 warheads. Russia has increased efforts in recent years to extend the service lives of most strategic systems in order to maintain as many warheads as possible.

- Until recently, one of Russia's highest military priorities has been the deployment of its most modern ICBM, the SS-27/Topol'-M. Twenty single-warhead SS-27s were deployed by the end of 1999. Russia planned to deploy ten additional missiles by the end of 2000, but only half were deployed. Deputy Prime Minister Klebanov said last October that Russia would deploy a minimum of six missiles annually over the next decade.

Nuclear Warhead Security

The Russians have maintained security and control of their nuclear warheads and weapons, although the economic crisis of the 1990s and the consequent decline in military funding have stressed the country's nuclear security system.

- Russia currently uses essentially the same nuclear command and control system built by the Soviet Union, whose military and political leaders—concerned about the possibility of an unauthorized launch—built a highly centralized system with technical and procedural safeguards. We judge that an unauthorized launch or accidental use of a Russian nuclear weapon is highly unlikely as long as those safeguards remain in place. A breakdown of central political authority, however, would raise our concerns about possible circumvention of the system.

- Since the dissolution of the Soviet Union, Moscow has consolidated all nuclear weapons of the former Soviet stockpile into storage sites in Russia. We assess that by June 1992, the last of the former Soviet tactical nuclear warheads were withdrawn to Russia, and that by the end of 1996, the last of the strategic nuclear warheads had been removed from Kazakhstan, Ukraine, and Belarus.

Russian officials have stated that thousands of nuclear warheads from the former Soviet stockpile have been dismantled since 1991; reportedly over 10,000 warheads have been eliminated.

- Bilateral agreements between Ukraine and Russia called for the elimination of some 4,500 nuclear warheads—both nonstrategic and strategic—that were once stored on the territory of Ukraine. Ukrainian officials reportedly monitored the disassembly of these nuclear warheads at the Russian dismantlement facilities. Press reports indicate that

the Ukrainian nuclear warheads were eliminated by 2000.

Moscow is significantly reducing its nonstrategic nuclear stockpile. In October 1991, then-Soviet President Gorbachev, responding to a US presidential initiative, announced that the Soviet Union would unilaterally consolidate most of its nonstrategic nuclear warheads in central depots and would eliminate a major portion of them. In January 1992, President Yel'tsin publicly reaffirmed Gorbachev's announcement. Although Russia has taken some actions to fulfill these pledges, Moscow—because of concerns over deteriorating conventional capabilities—probably will retain several thousand nonstrategic nuclear warheads through at least 2015.

Physical Security. To secure their weapons, the Russians employ a multi-layered approach that includes physical, procedural, and technical measures. The security system was designed in the Soviet era to protect weapons primarily against a threat from outside the country and may not be sufficient to meet today's challenge of a knowledgeable insider collaborating with a criminal or terrorist group. General-Colonel Igor Valynkin, chief of the 12th Main Directorate of the Ministry of Defense (12th GUMO)—the organization responsible for warhead storage, maintenance, and logistics—stated in August 2000 that there have been no incidents of attempted theft, seizure, or unauthorized actions involving nuclear weapons.

Since the September 2001 terrorist attacks in the United States, President Putin and Valynkin have conducted a public campaign to provide assurances that terrorists have not acquired Russian nuclear weapons.

- Valynkin announced on 25 October that security had been stepped up at Russian nuclear weapons storage sites since the attacks on the United States. He also noted that security had been heightened earlier in the year after Russian authorities had twice thwarted terrorist efforts to reconnoiter nuclear weapons storage sites. Valynkin stated that none of the terrorists entered the nuclear weapons sites.

- At a subsequent press conference on 27 October, Valynkin was adamant that no Russian nuclear weapons had been stolen and described such allegations as "barking mad." He reiterated that nuclear warhead personnel are subject to psychological, lie detector, drug, and alcohol testing.

- In a 10 November interview, President Putin said he was "absolutely confident" that terrorists in Afghanistan do not have Soviet or Russian weapons of mass destruction.

Over the last six years, Moscow has recognized the need for security improvements and, with US assistance, has taken steps to reduce the risk of theft. We judge that nuclear security would improve over time *if* Russia routinely implemented security upgrades and procedures under US-funded threat reduction programs. Some of the key US-funded security upgrade programs include:

- Perimeter security upgrades around nuclear storage sites, including fences, sensors, and alarms.

- Computers to automate the warhead inventory management system.

- Transportation upgrades to railcars and the provision of supercontainers and Kevlar blankets for shipment of warheads to increase their protection from small-arms fire.

- Training and equipment for Emergency Response Teams for nuclear accidents.

Valynkin has admitted that a lack of domestic funding has made Russia dependent on foreign assistance for physical security upgrades. Quoting Valynkin, an August 2000 press report stated that the United States is financing the procurement of security systems for the MOD. The newspaper also described Valynkin as troubled because only a third of the new equipment had been put into service due to funding shortages. Despite the lack of funds, however, the chief of the MOD's Special Construction Troops reported in December 2000 that security enhancements were being completed at dozens of nuclear facilities.

Even with the enhancements, security problems may still exist at the nuclear weapons storage sites. In August 2001, an anonymous military officer claimed in a Russian television program interview that security was lax at 12th GUMO sites. The officer outlined a number of problems at the storage sites, including charges that there are personnel shortages and that alarms systems operate only 50 percent of the time. The officer speculated that a terrorist organization could seize a nuclear warhead.

Personnel Reliability. Much like other parts of the military, the Strategic Rocket Forces and the 12th GUMO have also suffered from wage arrears as well as shortages of food and housing allowances. In 1997, the 12th GUMO closed a nuclear weapons storage site due to hunger strikes by the workers; in 1998, families of several nuclear units protested over wage and benefit arrears. According to Russian press, the MOD addressed most of the arrears by early 1999, and wages are now paid regularly. Even when paid, however, officers' wages rarely exceed $70 a month and wives cannot earn a second income because the storage sites are usually located far from cities, according to the anonymous 12th GUMO officer.

- Housing for 12th GUMO personnel is of poor quality or nonexistent. According to the Chief of Staff of the 12th GUMO, there are 9,500 homeless active duty and retired officers. The poor living conditions of the officers—who contend with lack of heating, leaky plumbing, and deteriorating buildings—have been reported by Russian press.

Moscow has acknowledged the potential vulnerability of its nuclear security personnel. In October 1998, General Valynkin referenced serious incidents that had occurred at some of his subordinate facilities and stated that more stringent selection criteria for nuclear warhead personnel would be used. Speaking at a press conference concerning US CTR funding in February 1999, Valynkin acknowledged, "the greatest problem is the person who works with nuclear warheads. He knows the secrets, he has the access, he knows the security system."

- Valynkin emphasized that personnel are thoroughly screened for links to the crime world and for their suitability to work with warheads.

- He added that the 12th GUMO would be using US CTR-provided polygraph equipment and drug and alcohol tests to monitor the reliability of its personnel. In May 2000,

Valynkin stated that two students at the 12th GUMO's Security Assessment Training Center were expelled as a result of the drug tests.

- Valynkin also reported in May 2000 that the MOD is changing warhead transport security operations by using officers rather than enlisted personnel because across the entire MOD, during that month alone, seven sentries had left their posts.

Ministry of Atomic Energy

Nuclear Materials Security

Russian officials recognize the need to improve the security of weapons-usable nuclear materials that we assess are stored in over 300 buildings at over 40 facilities across the country. After a cabinet meeting on the topic in September 2000, Prime Minister Kasyanov stated publicly that protection of fissile materials varies from place to place and that in some cases the material is endangered. At the same press conference, a Deputy Minister of Atomic Energy noted that reported attempts to steal fissile materials had dropped significantly in recent years. He said that whereas there were 21 such reports from 1991 to 1994, there were only two from 1995 to 1999. The Deputy Minister also criticized Western press reports for exaggerating the problem.

- Minatom officials provided no details about the incidents and have not subsequently provided updated data for 2000 and 2001. There have been, however, a number of press reports about materials seized in Russia about which we have no further information because Russia typically does not reveal the results of its investigations.

Press reports, in fact, generally overstate the impact of stolen material, often referring to or implying that depleted, natural, or low-enriched uranium are weapons-grade or weapons-usable material.[1]

- Weapons-usable material is defined as uranium enriched to 20 percent or greater in the uranium-235 or uranium-233 isotopes (highly enriched uranium—HEU) and any plutonium containing less than 80 percent of the isotope plutonium-238.

- Weapons-grade material is typically defined as uranium enriched to greater than 90 percent uranium-235 or uranium-233, or plutonium-239 containing less than 6 percent plutonium-240.

Russian institutes have lost weapons-grade and weapons-usable nuclear materials in thefts.

- In 1992, 1.5 kilograms of 90-percent-enriched weapons-grade uranium were stolen from the Luch Production Association.

- In 1994, 3.0 kilograms of 90-percent-enriched weapons-grade uranium were stolen in Moscow.

- In 1999, we confirmed that a Bulgarian seizure of nuclear material was

weapons-usable. The material—four grams of HEU—likely originated in Russia.

- Although not independently confirmed, reports of a theft in 1998 from an unnamed enterprise in Chelyabinsk Oblast are of concern. According to Viktor Yerastov, chief of Minatom's Nuclear Materials Accounting and Control Department, the amount stolen was "quite sufficient material to produce an atomic bomb"—the only nuclear theft that has been so described.

The reduction in seizures of stolen material and in reported theft attempts may be due to several factors: US assistance to improve security at Russian facilities, a possible decrease in smuggling, or smugglers becoming more knowledgeable about evading detection. We assess that undetected smuggling has occurred, although we do not know the extent or magnitude of undetected thefts. Nevertheless, we are concerned about the total amount of material that could have been diverted over the last 10 years.

Efforts To Improve Physical Security and Safeguards. Prior to DOE assistance to enhance safeguards and security, Russian MPC&A practices did not meet internationally accepted standards. Russian facilities housing nuclear materials typically receive low funding, lack trained security personnel, and do not have sufficient equipment for securely storing nuclear materials. The DOE-administered MPC&A program, as well as other programs, is assisting the former Soviet states to upgrade safeguards (accountability and control) over nuclear materials and physical security at a wide range of nuclear facilities. For example:

- A US-funded computer system to handle inventory reporting to Minatom headquarters began to come on-line at pilot facilities in mid-2001 and will require officials to track materials closely to better assure timely detection in the event of a loss or diversion.

- The US Department of Defense is helping Russia to build a state-of-the-art storage facility for long-term secure storage of plutonium and HEU from dismantled nuclear weapons.

- Russia and the United States have broadened their cooperative work to include securing Russian Navy highly enriched uranium reactor fuel at three naval land-based storage sites.

- The United States is purchasing 500 MT of HEU—$12 billion over a 20-year period—which Russia is blending down into low-enriched uranium suitable for use in nuclear power reactors.

- A new DOE/Minatom effort seeks to convert highly enriched uranium to low enriched uranium under the MPC&A Program's Material Consolidation and Conversion initiative.

- DOE has implemented a sustainability program to assist with maintenance, training, and operation of the upgraded physical security systems in response to Russian budgetary problems and potential neglect of equipment.

In mid-2001 DOE reported that by the end of FY 2001 "comprehensive" security upgrades

would have expanded to cover an estimated 21 percent of Russia's weapons-usable nuclear material, and that if facilities protected by "rapid upgrades" were added, the percentage would increase to 48.[2] When the upgrades currently underway are completed, the portion of material with improved security will increase to approximately 65 percent. Progress is most advanced at civilian institutes and Russian Navy sites, and lags at Minatom facilities within the nuclear weapons complex—which contain most of the material of proliferation interest—because Russian security concerns prevent direct US access to sensitive materials.

- The progress at civilian and naval sites addresses key vulnerabilities because seizures involving HEU and separated plutonium have been linked to these locations rather than nuclear weapons assembly/disassembly plants.

- Russia's nuclear MPC&A has been slowly improving over the last several years, but risks remain.

Economics and Personnel Reliability. Even after technical modernization, security for weapons-usable nuclear material depends largely on the diligence, competence, and morale of personnel who monitor systems and guard material and facilities and on managers who must emphasize security over production. Programs to improve physical security, accountability, and training could be undermined by disgruntled Russian personnel or unreceptive managers and employees.

Because of improvements in the national economy, Russia and Minatom are now able to pay personnel on time. Thus, for now, compensation and benefits appear adequate, and personnel no longer face the financial pressures of the late 1990s that might have led some to permit or actively participate in weapons-usable nuclear material theft.

Convenience and pressure to produce also can contribute to lapses in security. US Government Accounting Office auditors noted in their February 2001 report that, at one facility, a gate in a fence emplaced with US aid around a weapons-usable nuclear material storage building was routinely left open and unguarded during the day. Russian officials explained that it was simply too much trouble for the employees to open and close the combination lock repeatedly as they entered and left the building. This practice, however, undermined control of access and meant that the only security measures in effect were the perimeter fence and guards at the facility.

Safety at Russian Nuclear Material Processing Facilities

Russian HEU facilities have at least three levels of contamination control.

- Level one denotes an area of essentially no contamination.

- Level two denotes an area of lower contamination where personnel are required to wear protective clothing and masks, but extensive monitoring is not required. Such areas include oxide purification, calcining, container storage, and fluorination.

- Level three denotes an area of high contamination that requires protective clothing and masks, and requires extensive monitoring to reduce the spread of contamination. Such

areas include metal machining and oxidation.

The monitoring of personnel radiation safety is also a multi-layered process.

- Workers and visitors are required to wear the standard Russian particulate control mask while in nuclear facilities. In addition, shoes and protective clothing (hats, gloves, lab coats, and in the chemical metallurgical areas full body protective clothing) are provided.

- Radiation dosimeters are available and generally are used by Russians and visitors to their plants. Radiation- monitoring devices mounted along the walls are present in areas of HEU operations, along with air-sampling ports.

- Personnel and visitors are required to wash their hands when leaving contaminated areas; then both hands and feet are checked by an alpha radiation detector.

Another safety program is criticality safety—the process established to prevent the initiation of self-sustaining nuclear chain reaction. There are two main types of controls used to prevent criticality accidents: administrative controls and physical controls.

- Administrative controls refer to a series of rules and regulations that limit how much material may be in a specific type of container or location to prevent a critical mass from forming.

- Physical controls—such as the use of specially sized and configured pipes or designated storage locations that ensure proper spacing—are designed to separate fissile material and prevent a critical mass.

Russian nuclear facilities predominantly use physical controls, which are the more stringent and secure of the two types of controls, although we question whether they routinely follow their own rules.

Safety and Security at Russian Civilian Nuclear Power Plants

Russia has announced plans to more than double its capacity to generate nuclear power over the next 20 years, to begin construction of reactors with enhanced safety features, and to restart its long-dormant fast breeder reactor program. The funding has not yet been allocated. To fulfill the plan, Russia will have to extend the lives of the first-generation plants, which presents some risk to the safety of individuals living near them.

- Russian RBMK and VVER-440 and -1000 reactors are aging and seven first-generation Russian nuclear power reactors will reach the end of their service lives within the next five years.

- A major continuing problem for the Russian nuclear power industry is the failure of its customers to pay for electricity, which has contributed to a lack of resources for maintenance, spare parts, and salaries.

Western assistance has been improving the safety systems and operating procedures at

Soviet-designed nuclear reactors. However, inherent design deficiencies in RBMK and older model VVER reactors will prevent them from ever meeting Western safety standards.

- The Most notable design flaw is the lack of Western-style containment structure to prevent the release of fission products in the event of a serious accident.

- Other serious design shortcomings include poor fire safety and undersized emergency core cooling systems.

- Another potential disastrous flaw in the VVER reactors is the susceptibility of its reactor pressure vessels to become brittle because of radiation, thermal changes, and mechanical vibrations. This gradual loss of malleability, which particularly affects the welds, could cause the container to crack and rupture, especially during an emergency shutdown when the vessel is suddenly filled with comparatively cold water.

After the September terrorist attacks in the United States, Minister of Atomic Energy Aleksandr Rumyantsev reported that Russian nuclear power facilities are protected by special guards patrolling around the clock in addition to national defense forces. A Rosenergoatom official reported on 12 September 2001 that security services at the nuclear power plants are already working a "harsh regime" because of the continuing military actions in Chechnya and that additional security measures were not necessary. Since July, Russian media have reported increased security measures at a number of plants:

- The Voronezh Oblast decided to reinforce security at the Novovoronezh nuclear power plant. The Main Directorate of Internal Affairs of the Oblast was to coordinate with the Federal Security Service to ensure adequate protection of the plant's perimeter, and trees and vegetation around the plant were to be cut down.

- An exercise was conducted at the Volgodonsk nuclear power plant to practice preventing a terrorist act. The exercise involved plant personnel and units from the power ministries.

- The Kola nuclear power station stepped up security. Internal troops were continually patrolling the perimeter, additional checkpoints had been set up, and armored personnel carriers were available to respond to a call.

- In Rostov, an FSB spokesman said his agency and other law enforcement officials had learned of possible extremist threats to nuclear installations in the region and were enhancing protection of the nuclear power plant.

Even with increased security, however, Russian nuclear power plants almost certainly will remain vulnerable to a well-planned and executed terrorist attack.

[1] In contrast, non-weapons-grade nuclear material thefts, particularly containers of radionuclides such as cesium-137 or strontium-90, have been frequent and well documented. Terrorists could use these radionuclides to build a radiological dispersal device (RDD). An RDD is defined as a device designed to disperse radioactive material to cause injury and contamination by means of the radiation. Reportedly, Chechen terrorists placed a container holding a small amount of cesium-137 in a Moscow Park in November 1995. Remarking on this event, General Dudayev, the former leader of the Chechen independence movement, stated "[this] is just a scant portion of the radioactive substances which we have at our disposal."

[2] "Rapid upgrades" include items such as baseline item inventories, locks, delay blocks, steel cages, limiting access, and hardening windows. "Comprehensive upgrades" include rapid upgrades plus detection systems, closed-circuit television monitoring and assessment systems, material measurement equipment, and computerized accounting systems.